VIII. *A ſhort Account of Dr.* Jurin's *Ninth and laſt Diſſertation* De Vi Motrice, *by Mr.* John Eames, F. R. S.

THE laſt Diſſertation is * new, and treats of the Motive Forces of Bodies, whether they are to be eſtimated by the Velocities, or the Squares of the Velocities, when the Maſſes are equal. The Original of this Diſpute among the Mathematicians, the Author aſcribes to a Slip committed by the celebrated Mr. *Leibnitz*, in the Year 1686. and the Continuance, to the Neglect of the Times, wherein equal Effects are produced. The one Side aſſerts all Cauſes to be equal, whoſe Effects are ſo, whether the Times, during which the Cauſes act, are ſhorter or longer. The other, on the contrary, maintains, that equal Effects may ariſe from unequal Cauſes, if the Times of Action are unequal; that conſequently the Times, as well as the Effects, ought to be taken into the Account.

He wiſhes the Gentlemen on the other Side of the Queſtion would produce ſome Experiment in their Favour, where the Equality of the Times is preſerved; ſince all the Experiments they have hitherto made, and argued from, may juſtly be ſet aſide, as incompetent, on the Account of the Inequality of the Times of Action.

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* The Eight preceding Diſſertations had been before printed ſeparately; but were now all collected together, with the Addition of this Ninth, and publiſhed in one Volume in *Octavo*, *London*, 1732.

The Author then proceeds to prove the Truth of the common Opinion of the Forces in equal Bodies being proportional to their Velocities. This he does by Three Mediums, the Firſt taken from the Action of a ſingle Spring upon the ſame Body: The Second from ſome Experiments of Mr. *Mariotte*; the Third from the joint Action of ſeveral Springs upon Two unequal Bodies.

I. A ſingle Spring, fixed to a moveable horizontal Table, is made to communicate to the ſame Body, Degrees of Force unqueſtionably equal, while the Degrees of Velocity communicated at the ſame time are alſo undoubtedly equal; therefore the Forces are proportional to the Velocities.

II. In Mr. *Mariotte*'s Experiments, the Impreſſions made upon equal Surfaces in the ſame Point of Time, are found to be in the Duplicate *Ratio* of the Velocities; but the Maſſes or Numbers of impinging Particles are in the ſimple *Ratio* of the Velocities; conſequently, the Maſſes and Velocities conjunctly being in the Duplicate *Ratio*, *i. e.* as the Impreſſions, muſt alſo be as the Forces which made them: Which is the old Opinion.

III. A complicated or bent Spring interpoſed between Two unequal Bodies, acting upon each with an equal Preſſure, and during an equal Time, muſt communicate equal moving Forces to each; but their Velocities are by Experiment reciprocally proportional to their Maſſes; therefore their Maſſes, drawn into their reſpective Velocities, are alſo equal, as were their moving Forces; and by conſequence their moving Forces are as the Maſſes and Velocities conjunctly: Which is the generally received Opinion.

In the Appendix, the Author anſwers ſome of the principal Arguments brought in favour of the contrary Side.

I. The firſt is drawn from the compound Motion of a Body along the Diagonal of a Rectangle, whoſe Sides repreſent the ſimple Motions. Here it is ſaid, that the ſimple Forces are no-ways contrary to each other; that being united or added together in the compound Force, that compound Force will not be to both or either of the ſimple Forces, as the Diagonal is to both or either of the Sides; but as the Square of the Diagonal to the Sum of the Squares of the Sides, or to the Square of either Side reſpectively. He anſwers, The ſimple Forces, while they act in their proper Directions, are not contrary to each other, either Wholly or in Part; but when conſidered as contributing to the Motion of the Body in the Direction of the Diagonal, Part of the one acts contrary to Part of the other, and deſtroys it; as is evident, if you reſolve each ſimple Force into two others, one acting along the Diagonal, the other in a Direction perpendicular to it. And then it is to be obſerved, that the Sum of the two former is equal to the Diagonal (while the two latter deſtroy each other): Which is perfectly agreeable to the old Opinion, but not at all to the new; for the demonſtrating of which this Argument is brought.

II. The ſecond Proof is taken from the equal Compreſſion of Four equal Springs, before the Force was conſumed, by the ſame Body moving with double the Velocity; and labours at the Bottom under the ſame Parallogiſm.

III. The laſt Argument is founded upon the learned and ingenious Mr. *Poleni's* Experiment, wherein equal Cavities are formed in ſoft Subſtances, by equal Bodies falling from Heights reciprocally proportional to their Maſſes. This the Author ſets aſide, as inſufficient, ſince the Times of forming theſe equal Cavities are unequal, and unequal Cauſes may produce equal Effects in unequal Times. The learned Mr. *Poleni* does, indeed, reply, and ſay, that the Formation of theſe Cavities ſeems to be inſtantaneous: But the ingenious Author ſhews the contrary, and that from a Poſition allowed of by *Poleni* himſelf, in his Reply.

IX. *An Account of ſome remarkable Stones, taken out of the Kidneys of Mrs.* Felles, *upon opening her Body after her Deceaſe, by* Noah Sherwood, *Surgeon.*

UPON opening the Body of Mrs. *Felles*, I found nothing amiſs in any of the *Viſcera*, till I came to the Kidneys, both of which were conſiderably inlarged, and of an oblong Figure, and had ſeveral Protuberances bunching out, which made the Surface appear almoſt like a Beeve's Kidney. Upon feeling them externally, I could plainly perceive they were cauſed by Stones: I took them out of the Body, and laid them open Longitudinally, and found in the Right Kidney ſeveral Stones of an irregular Figure, branched like Coral: They had extended themſelves beyond the Capacity of the *Pelvis* on every Side, (al-